Technical guidance: A review of LCDS for RE development in Vietnam

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Publication date:
2013

Technical guidance: A review of LCDS for RE development in Vietnam

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Second Capacity Building Workshop on LCD and NAMAs

Da Son, Hai Phong, Vietnam, 16-18 December 2013

Outline:

- Objectives
- The global mitigation challenge
- Existing policies in Vietnam
- Methodologies for BAU/baseline scenarios
- The BAU/APS scenario for 5% RE in energy primary supply
- Policy recommendations

Objectives

Objectives of the review

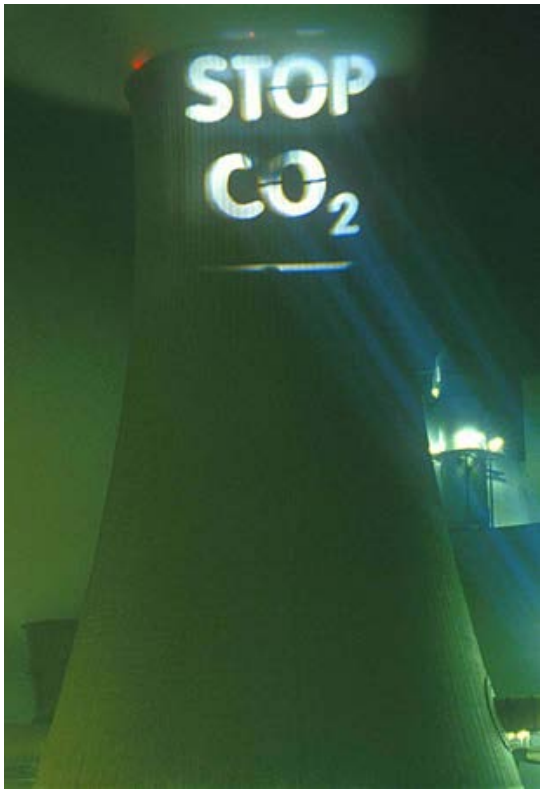
- To understand the work so far on development of a LCDS for RE development in Vietnam

- Provide technical guidance on key issues:
  - Establishment of baseline for BAU and LCD/APS scenarios
  - Policy recommendations

The global mitigation challenge

The mitigation challenge according to IPCC 2007

- **Without action - global CO_2 emissions will grow between 40 and 110% between 2000 and 2030**
- **To stay below 2 degrees global average warming and avoid major damages:**
  - global CO_2 emissions should start declining by 2015 and
  - be reduced with 50-85% below 2000 level by 2050



Emission reductions required for stabilising climate with fair distribution of effort

Scenario category	Region	2020	2050
A-450 ppm CO_2-eq [2]	Annex I	**–25% to –40%**	–80% to –95%
	Non-Annex I	Substantial deviation from baseline in Latin America, Middle East, East Asia ***(-15% to -30% from BAU)***	Substantial deviation from baseline in all regions
B-550 ppm CO_2-eq	Annex I	–10% to –30%	–40% to –90%
	Non-Annex I	Deviation from baseline in Latin America and Middle East, East Asia *(0 to -20% from BAU)*	Deviation from baseline in most regions, especially in Latin America and Middle East

Impacts of 2° C warming – worse than expected

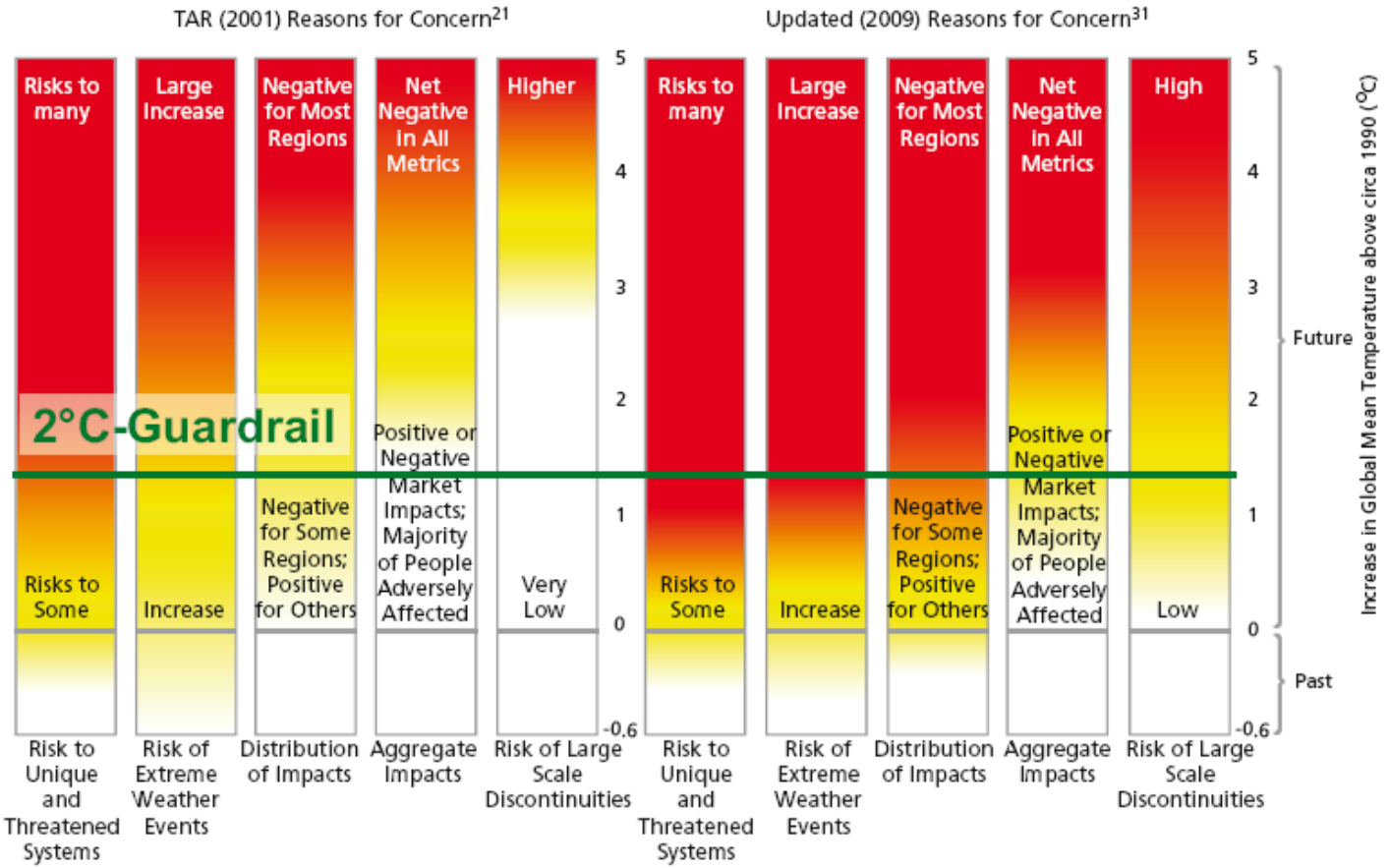
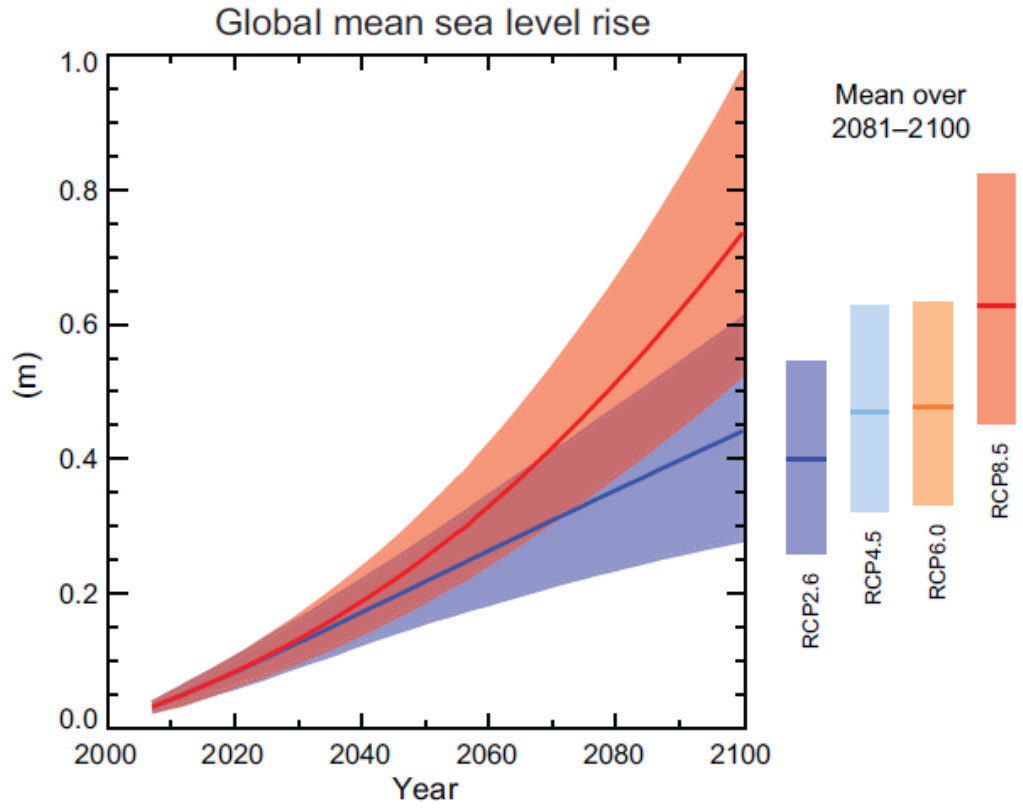


Figure 8
Diagram relating the potential impacts of climate change to the rise in global average temperature. Zero on the temperature scale corresponds approximately to 1990 average temperature, and the bottom of the temperature scale to pre-industrial average temperature. The level of risk or severity of potential impacts increases with the intensity of red colour. The 2°C guardrail is shown for reference.

Expected sea level rise



Source: IPCC AR5 WG1 SPM. Figure SPM.9, 2013

Existing policies in Vietnam

Existing energy and climate policy targets in Vietnam

Year	Type of target	Title of policy decision	Target
2007	Energy	National Energy Development Strategy	Renewable energy share of total primary commercial energy supply in 2020 is 5%, by 2015 it is 8% and by 2050 it is 11%
2011	Energy - power supply	National Power Development Plan (PDP VII)	Renewable energy share of power generation is 4.5 % in 2020 and 6% in 2030 • Wind power: 0.7% of total power generation by 2020 and 2.4 % by 2030. This translates to 1,000 MW of installed capacity in 2020 and 6,200 MW by 2030
2011	Climate change	National Strategy on Climate Change (Decision 2139/QD-TTg)	Reduce GHG emissions to protect the Earth's climate – reference is made to existing energy and industry policy targets
2012	Mitigation	National Green Growth Strategy (Decision 1393/QD-TTg)	Reduce GHG emissions from energy activities by 10-20% compared to BAU in 2020 + 10% with international support and by 20-30% in 2030 + 10% with support.
2012	Mitigation	Project for GHG management: Management of Carbon Credit Business Activities to the World Market (Decision 1775/QD-TTg)	Implement a number of sector specific GHG reduction targets: • Energy and transport: Reduce GHG emissions by 8% compared to 2005 • Agriculture: Reduce GHG emissions by 20% compared to 2005 • Forestry and land use: Increase the absorption of GHG by 20% compared to 2005 • Waste: Reduce GHG emissions by 5% compared to 2005

Observations

Consistency across policies?

- The emission reduction targets for Green Growth and GHG management are of a different kind: BAU vs. 2005 as baseline
- It makes a big difference in terms of mitigation ambition, which target is used
- The base year approach gives the most certainty in accounting for GHG reductions, which is needed for trading in the world market

Methodologies for BAU/baseline setting

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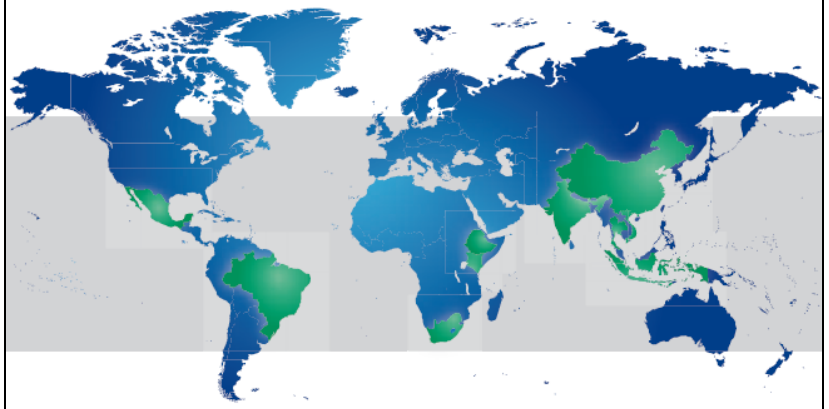
National Greenhouse Gas Emissions Baseline Scenarios

Learning from Experiences in Developing Countries



A report by the Danish Energy Agency, the Organisation for Economic Co-operation and Development and the UNEP Risø Centre, based on contributions from experts in Brazil, China, Ethiopia, India, Indonesia, Kenya, Mexico, South Africa, Thailand and Vietnam

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Aim of the publication

1. Provide overview of current practices
2. Show differences and commonalities in countries' approaches to baseline setting
3. Explain motivation of choices made
4. Highlight good examples and lessons learnt
5. Inspire other developing countries
6. Discuss significant capacity gaps
7. Inform discussions on guidelines

Table 2: Overview of the sectors included in baseline scenarios and the models used

	Energy	LULUCF	Agriculture	Industrial Processes	Waste
Brazil (UFRJ)	Bottom-up (MESSAGE/ MAED)	Simple extrapolation of historical annual deforestation			
China (ERI)	Hybrid model (IPAC)				
Ethiopia	Top-down (simple extrapolation using spreadsheets) and bottom-up (MAC curves)				
India (TERI)	Bottom-up (MARKAL/TIMES) and CGE models			Included in energy modelling	
Indonesia	Bottom-up (LEAP) for both provincial and national level	LUWES/Abacus – spatial planning approach	Included in LULUCF modelling	Included in energy modelling	Simple linear projection model
Kenya	Bottom-up (intensity extrapolation)				
Mexico	Bottom-up (in-house). Planned future work: bottom-up (LEAP)				
South Africa (ERC)	Bottom-up (MARKAL/TIMES) and CGE-model	Spreadsheet model	Spreadsheet model	Spreadsheet model	Spreadsheet model
Thailand	Bottom-up (LEAP)				
Vietnam	Bottom-up (LEAP)	COMAP	Based on IPCC guidelines		

Note: The colours indicate whether sectors are included or not in the baseline scenario (where information was made available). Green=included, dark grey=not included and light grey=information not provided.
Source: Country contributions (see Part 2).

What is a baseline?

- **Baseline scenario:** A scenario that describes future greenhouse-gas emission levels in the absence of future, additional mitigation efforts and policies.
- Often used interchangeably with “business as usual”
- An estimation of the future, not a prediction

Definition of the baseline

- Is the baseline a business-as-usual?
- Two defining points: inclusion of policies and whether or not the baseline will be updated.

Inclusion of policies

- Emissions trajectories are (hopefully!) greatly affected by policy implementation
- Three questions for considering effects of policy measures in baselines:
  - Whether to include existing policies or no policies at all (and if none, how to “extract” effects of existing measures)
  - Which measures to include as part of the baseline?
  - How to model the impact of those measures?

Different types of reduction pledges under UNFCCC

	Pros	Cons
Reduction relativ to historic year (e.g. X pct. under 1990 levels)	Certainty about emission level in target year	The cost of meeting the pledge is sensitive to exogenous changes (e.g. higher fossil fuel prices)
Reduction relativ to business-as-usual (e.g. X pct. under 2020 BaU) which is updated regularly	Even when economic growth is high, pledge will be a reduction The cost of meeting the pledge is less sensitive to exogenous changes (e.g. higher fossil fuel prices)	Uncertainty about emission level in target year No guidelines in doing baselines, thereby hard to interpret pledge

Key driver assumptions

- Several key drivers
  - GDP, structure of the economy, population, energy prices, technological development…
- GDP is the most important key driver
  - Often GDP forecats are defined for other purposes…

Transparency and credibility

- National and international credibility regarding the baseline are acknowledged as key concerns.
- Nationally, credibility ensures credible national policy planning
- Internationally, credibility ensures acknowledgement for mitigation pledge and efforts.
- The global nature of climate change means that the better governments understand the positions of other governments, the more likely cooperative action becomes.

Key examples of good practice

- Clear definition and purpose
- Policies
- Revisions/updates
- Key drivers (GDP etc.)
- Uncertainty

The LCD scenario for RE development

Review of the LCDS – the energy balance

Energy Balance 2010 BAU

Primary Energy Supply

	Mtoe
Coal	14.60
Oil	17.70
Natural Gas	8.40
Hydropower	2.20
Biomass	8.60
Renewable	0.30
Electricity Import	0.40
Total	**52.20**

Power Generation

Mtoe	Conversion Effieciency	TWh
4.70	0.31	17.00
2.40	0.16	4.60
7.90	0.47	43.10
2.20	1.01	25.90
0.00	0.00	0.00
0.30	0.50	1.80
0.00	0.00	0.00
17.50	**2.45**	**92.40**

1 Mtoe = 11.63 TWh

92.4 TWh = 7.94 Mtoe

Demand by Fuel

	Mtoe
Coal	9.90
Oil	15.30
Natural Gas	0.50
Hydropower	0.00
Biomass	8.60
Renewable	0.02
Electricity	7.50
Total	**41.82**

Demand by Sector

	Mtoe
Residential	10.80
Industry	17.50
Transport	11.10
Agriculture	0.60
Commercial	1.80
Total	41.80

Source: Alternative Policy Scenarios for Renewable Energy Development of Vietnam (first draft), December 2013

BAU/APS scenarios by 2030

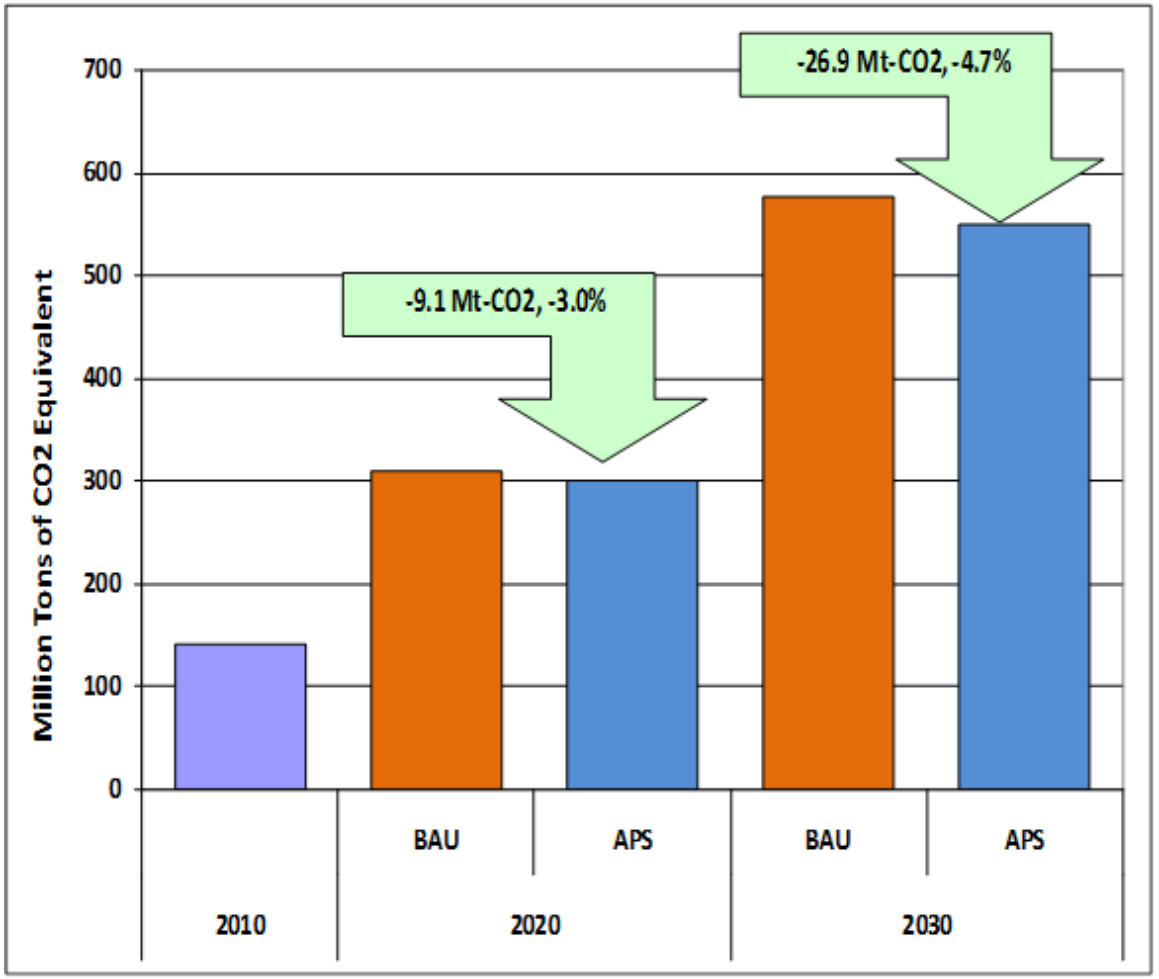
Demand by fuel

	Mtoe	
	APS	BAU
Coal	23.60	24.10
Oil	46.00	46.80
Natural Gas	2.70	2.70
Electricty	41.80	42.70
Biomass	1.20	1.20
Renewable	2.20	0.70
Total	**117.50**	**118.20**

Primary energy supply

	Mtoe	
	APS	BAU
Coal	85.8	91.8
Oil	47.9	48.7
Natural Gas	17.9	18.1
Nuclear	15.1	15.2
Hydropower	5.5	5.6
Biomass	3.2	1.3
Renewable	10.4	2.5
Imported electricty	1.3	1.4
Total	**187.1**	**184.6**

CO_2 emission reductions



Source: Figure 3.3 in Alternative Policy Scenarios for Renewable Energy Development of Vietnam (first draft), December 2013

Alternative Policy Scenario

- **Small hydro power**: 4,000 MW in 2030; BAU 2,600 MW
- **Biomass power plant:** 2,000 MW in 2030; BAU of 100 MW
- **Wind power plants:** 6,200 MW of installed capacity in 2030; BAU 200 MW
- **Biogas energy:** a) cooking: 12% of households in rural areas use biogas in 2030; BAU 2%. b) power generation: 60 MW in 2030; BAU 0 MW
- **Solar water heaters:** 70% in urban areas and 40% in rural areas by 2030; BAU 10% in urban areas and 3% in rural areas
- **Bio-fuels for transport:** 1,800 ktoe in 2030; BAU 600ktoe

Target for GHG reductions in the area of energy and transport by 2020: 8% compared to 2005

Activities and measures to reduce emissions:

- Efficient use of energy and energy savings
- *Developing renewable energy*
- Converting the use of fossil fuel use in power production
- Developing public transport
- Using liquefied gas to replace gasoline, diesel oil for passenger vehicles
- Producing constructional material, urban technical infrastructure

Source: Decision 1775/QD-TTg, 2012 on GHG management

Policy recommendations

The LCDS for RE development

- The LCDS study uses the 2007 target as the aim of the APS scenario: ‘RE share of total primary commercial energy is 5% by 2020’

- Ideally, actions and policies *already planned* should be part of the baseline (Source: the UNFCCC Handbook on NAMAs, 2013)

- Good practice for BAU scenarios considers whether or not to include existing policies in the baseline

- What are the considerations behind choosing an 2007 energy policy target as the aim of the LCDS in 2013, when there are two mitigation policy targets available from 2012?

From the Stern Review of the economics of climate change, 2006

- Climate change is the greatest market failure ever seen
- Postponing emission reductions is very costly, it implies:
  - Greater impacts and adaptation costs
  - Locking in high-carbon infrastructure (such as power-plants expected to last 40-50 years) and delaying 'clean' technology
  - More drastic cuts in emissions later on
- Putting an appropriate long-term price on carbon is the first element of policy – either through tax, trading (cap and trade) or regulation
- Technology transfer needs more than a carbon price – policies and international cooperation is necessary, e.g. R&D
- Scaling-up carbon finance to developing countries can support a transition to low-carbon development

Given the costs of impacts, taking urgent action is good economics

Expected cost of cutting emissions consistent with a 550ppm CO_2e stabilisation trajectory averages 1% of GDP per year.

- Resource cost: 1% of GDP in 2050, in range –1% to +3.5%.
- Macroeconomic models: 1% of GDP in 2050, in range +/- 3%.

Costs will not be evenly distributed:

- Competitiveness impacts can be reduced by acting together.

There will be opportunities and co-benefits:

- New markets will be created: worth over $500bn a year by 2050
- Climate policy consistent with energy access, energy security, air quality.

Strong mitigation is fully consistent with the aspirations for growth and development in poor and rich countries.

Ideas to enhance the LCDS for RE development

- Vietnam has an emission reduction target for energy and transport: 8% GHG reductions by 2020 compared to 2005 (Decision 1775/QD-TTg)

- For policy coherence compare what does the 8% GHG reduction target translate into expressed as ‘deviation from BAU’?

- An alternative to BAU baselines is to evaluate a NAMA in terms of its contribution to a national or sectoral ER target

- To strengthen the LCDS analyse what are the technical options to achieve the 8% GHG emission reduction target?

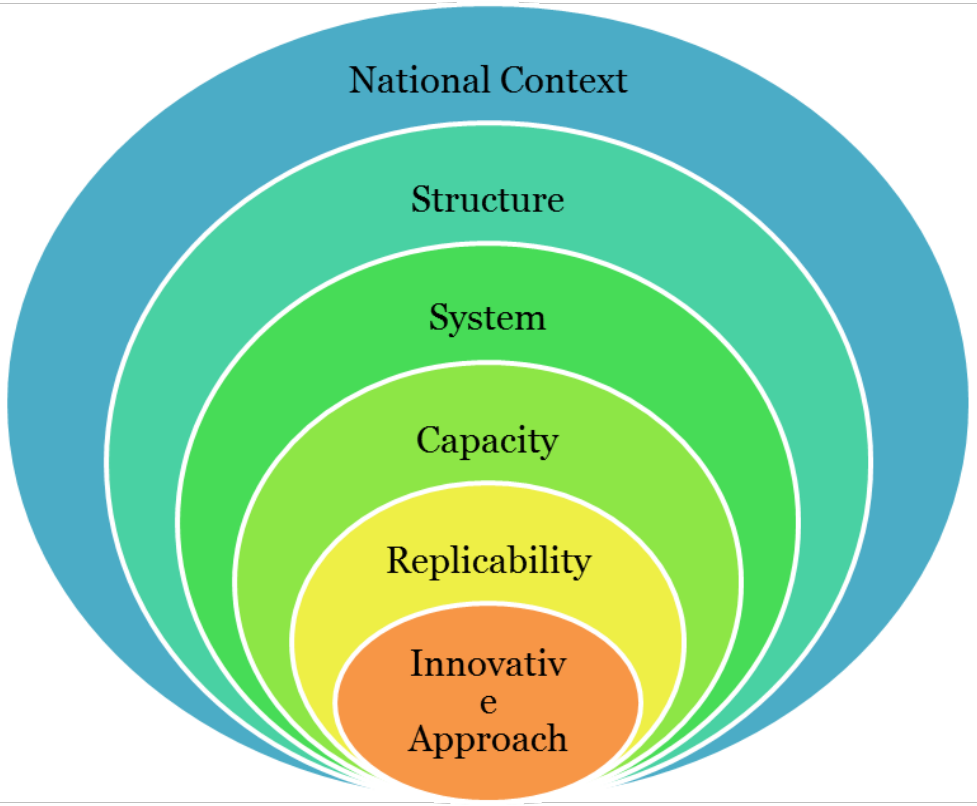
Opportunities to attract climate finance

- By choosing an existing *energy* policy as the aim of the LCDS study it may be difficult to attract international support. Domestic actions can be recorded in the UNFCCC Registry for recognition but are unlikely to be considered additional, nor transformational and the mitigation ambition (3% by 2020) falls short of what IPCC recommends to stay below 2 degrees of warming, namely 15-30% below BAU.

- To attract climate finance enhanced ambition is needed above existing policies/domestic action that contributes to the GHG mitigation targets already agreed in 2012

- Also the Green Climate Fund is mandated to support NAMAs for transformational change to low carbon and sustainable development

Elements of a paradigm shift for transformational change



Source: NAMA Facility, 2013

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Extra slides

Themes covered in the publication

Modelling tools	•Top-down, bottom-up or hybrid •Balancing cost with functionality
Assumptions and sensitivity analysis	•Definition: Inclusion of policies and revising the baseline •Key Driver Assumptions •Sensitivity Analyses
Data management	•Base year and UNFCCC emission inventories •Emissions factor and activity data quality •Institutional arrangement
Transparency and inclusiveness	•Transparency and credibility •Stakeholder involvement •Options for peer review
Reflections on best/good practice	•Transparency •Key assumptions and uncertainty •Guiding principles for good practice

Examples from the publication

- **South Africa:** essentially two baselines, with and without existing measures
- **Mexico** and **Brazil**: no existing policies but assessment of technology trends
- **Indonesia**: screening process to assess impact on emissions of existing policies

Conclusion

- Policy circumstances vary by country and good practice is to be transparent on the method used

Key questions to consider

- What is the definition of the baseline?
  - How will existing and future policies be handled?
  - Will it be updated regularly?
- Will key driver assumptions have to be defined by governmental targets?
- Good practice: To do sensitivity analyses

Updating/revising the baseline

- Whether or not and when to update the baseline as new data become available
- Trigger values for when assumptions have been wrong could be used, or a defined year interval (e.g. update every 2 years)
- Mexico has made legal provisions to update on a ”regular basis”. South Africa will not update.